

**Fiber Optic Damage Detection System for Composite Pressure Vessels****Inventor(s):****Thomas L. Andrews****Lorie R. Grimes-Ledesma**

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**ABSTRACT OF THE DISCLOSURE**

An optical fiber is wound onto an exterior surface of a composite structure, such as a composite overwrapped pressure vessel ("COPV"), in a two-dimensional pattern and adhered thereto, *e.g.*, with a resin, to detect damage to the structure caused by impacts to or handling of the structure. After fabrication of the structure, a signature, or baseline, reference signal is established by detecting a light signal transmitted through the length of the fiber. Later, after the structure has been transported, handled, or placed into service, a second signal similar to the first is sent through the fiber and compared with the reference signal. Changes detected in the signal indicate that the structure may have sustained structural damage that may be invisible to external visual inspection, but that can be detected by more costly and time consuming conventional non-destructive inspection methods. In another embodiment, a pulsed light signal reflecting from a discontinuity in the optical fiber can be used to determine the location of the damage.

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